What Works Clearinghouse

Phonological Awareness Training

Practice description

Phonological Awareness Training is a general practice aimed at enhancing young children's phonological awareness abilities. Phonological awareness refers to the ability to detect or manipulate the sounds in words independent of meaning. Phonological awareness is a precursor to reading. *Phonological Awareness Training* can involve various training activities that focus on teaching children to identify, detect, delete, segment, or blend segments of spoken words (i.e., words, syllables, onsets and rimes, phonemes) or that focus on teaching children to detect, identify, or produce rhyme or alliteration. Three related What Works Clearinghouse (WWC) intervention reports review two curricula for phonological awareness—*DaisyQuest* and *Sound Foundations*—and a similar practice—*Phonological Awareness Training plus Letter Knowledge Training.*

Research

Four studies of *Phonological Awareness Training* met the WWC evidence standards and two studies met the WWC evidence standards with reservations.[1] Together, these six studies included more than 100 preschool children from Washington State and the Pacific Northwest and examined intervention effects on children's phonological processing. Most of the children studied were from economically disadvantaged families, and about one-fourth of the children had developmental delays. This report focuses on immediate posttest findings to determine the effectiveness of the intervention.[2]

Effectiveness

Phonological Awareness Training was found to have positive effects on phonological processing.

	Oral language	Print knowledge	Phonological processing	Early reading/ writing	Cognition	Math
Rating of effectiveness	N/A	N/A	Positive effects	N/A	N/A	N/A

(continued)

1. To be eligible for the WWC's review, the Early Childhood Education (ECE) interventions had to be implemented in English in center-based settings with children ages 3 to 5 or in preschool. Two additional studies are not included in the overall effectiveness ratings because they compared variations of *Phonological Awareness Training* interventions to each other, which does not allow the effects of *Phonological Awareness Training* to be determined. See the section titled "Findings for comparisons between variations of *Phonological Awareness Training*" and Appendices A4.1–A4.3 for findings from these two studies.
2. The evidence presented in this report is based on available research. Findings and conclusions may change as new research becomes available.

Effectiveness *(continued)*

	Oral language	Print knowledge	Phonological processing	Early reading/ writing	Cognition	Math
Improvement index[3]	N/A	N/A	Average: +27 percentile points Range: −27 to +50 percentile points	N/A	N/A	N/A

Additional practice information

Developer and contact

Phonological Awareness Training does not have a single developer responsible for providing information or materials. The interventions described in this report were developed by the study authors and are not available for distribution through a common developer. However, readers interested in using *Phonological Awareness Training* practices in their classroom can refer to sources available through internet searches for information. A list of examples follows which has not been reviewed or endorsed by the WWC:

- Phonological Awareness: Instructional and Assessment Guidelines: http://www.ldonline.org/article/6254.
- Ideas and Activities for Developing Phonological Awareness Skills: A Teacher Resource Supplement to the Virginia Early Intervention Reading Initiative: http://www.pen.k12.va.us/ VDOE/Instruction/Reading/findings.pdf.
- Reading Rockets: Teacher Toolbox—Phonological Awareness: The Phive Phones of Reading: http://www.readingrockets. org/firstyear/fyt.php?SUB=33.
- Reading Rockets: Problems Involving Phonological and Phonemic Awareness: http://www.readingrockets.org/ helping/ target/phonologicalphonemic.
- Phonological Awareness Skills and Spelling Skills: http://cla.calpoly.edu/~jrubba/phon/phonaware.html.
- Vaughn Gross Center for Reading and Language Arts, University of Texas at Austin: http://www.texasreading. org/utcrla/materials/primary_phono_awareness.asp.

- Phonological Awareness and Reading Recovery: http://www.readingrecovery.org/sections/reading/phonics.asp.
- Improving Reading Fluency: Phonological Awareness Training: http://www.speechpathology.com/Articles/article_detail. asp?article_id=68.
- Florida Center for Reading Research: http://www.fcrr.org.
- University of Oregon: http://www.reading.uoregon.edu.
- National Reading Panel: http://www.nationalreadingpanel.org.

Scope of use

Published research studies examining *Phonological Awareness Training* practices began appearing in the mid- to late 1970s and early 1980s. Information is not available on the number or demographics of children or centers using these practices.

Teaching

Phonological Awareness Training practices can be used by teachers with individual children, in pairs, or in small group settings. These practices generally are used as a supplement to the regular classroom curriculum, and they have been used with specific subpopulations of students, such as students with learning disabilities. *Phonological Awareness Training* practices vary in their scope and may include such activities as rhyme detection training (e.g., teachers may engage children in a game involving rhyming words and questions about which word in a series of three does not sound like the others), blending training (e.g., teachers may say three sounds and teach children how to

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3. These numbers show the average and range of improvement indices for all findings across the studies.

Additional practice information *(continued)*

blend the sounds together to make a word), and segmentation training (e.g., teachers may say a short word such as "cat" and teach children how to separate the word into the three sounds that make up the word) at the phoneme, syllable, or word level.[4]

Cost

Information is not available about the costs of teacher training and implementation of *Phonological Awareness Training* practices.

Research

Eleven studies reviewed by the WWC investigated the effects of *Phonological Awareness Training* practices in center-based settings.[5] Four of the studies (Majsterek, Shorr, & Erion, 2000; O'Connor, Jenkins, Leicester, & Slocum, 1993a, b, c[6]) were randomized controlled trials that met WWC evidence standards. Two studies (Slocum, O'Connor, & Jenkins, 1993a, b[7]) were randomized controlled trials that met WWC evidence standards with reservations because of high overall attrition.[8] Two additional studies met standards (Yeh, 2003) and met standards with reservations (Maslanka & Joseph, 2002) and are included in this report; however, they compare different variations of *Phonological Awareness Training* to each other, which does not allow the effects of *Phonological Awareness Training* to be determined. Therefore, these studies are discussed separately, and the findings are not included in the intervention ratings. The three remaining studies did not meet WWC evidence screens.

Met evidence standards

Majsterek et al. (2000) included 40 three- to five-year-old low-income preschool children attending a Head Start program in Washington State. Forty-five percent of the children were female. Majsterek et al. compared a phonological processing outcome for an intervention group that participated in rhyme detection training with a comparison group that participated in semantic training (i.e., training that focused on word meanings).

O'Connor et al. (1993a) included 22 four- to six-year-old developmentally delayed children attending the Experimental Education Unit at the University of Washington. Eighty percent of the children had significant language delays. O'Connor et al. compared phonological processing outcomes for an intervention group that was taught blending skills with outcomes for children in a no-treatment comparison group that participated in regular preschool activities.

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4. Readers who are unfamiliar with the terminology related to *Phonological Awareness Training* and the development of reading may find it helpful to consult the glossary of terms available from the National Institute for Literacy (http://www.nifl.gov/partnershipforreading/glossary/glossary.html) and the definitions of outcome measures in Appendices A2.1–A2.3.

5. Three single-case design studies were identified but are not included in this review because the WWC does not yet have standards for reviewing single-case design studies.

6. O'Connor et al. (1993) is counted as three studies (O'Connor et al., 1993a, b, c) because it examined three different but relevant *Phonological Awareness Training* interventions. The WWC designated blending versus comparison as O'Connor et al. (1993a), segmenting versus comparison as O'Connor et al. (1993b), and rhyming versus comparison as O'Connor et al. (1993c). The same comparison group was used in all three studies.

7. Slocum et al. (1993) is counted as two studies (Slocum et al., 1993a, b) because it examined two different but relevant *Phonological Awareness Training* interventions. The WWC designated the blend-then-segment versus word manipulation-then-segment condition as Slocum et al. (1993a) and the segment-then-blend versus word manipulation-then-blend condition as Slocum et al. (1993b).

8. A teacher strike interrupted the intervention and may have contributed to the high rates of attrition.

O'Connor et al. (1993b) included 24 four- to six-year-old developmentally delayed children attending the Experimental Education Unit at the University of Washington. Eighty percent of the children had significant language delays. O'Connor et al. compared phonological processing outcomes for an intervention group that was taught segmenting skills with outcomes for children in a no-treatment comparison group that participated in regular preschool activities.

O'Connor et al. (1993c) included 23 four- to six-year-old developmentally delayed children attending the Experimental Education Unit at the University of Washington. Eighty percent of the children had significant language delays. O'Connor et al. compared phonological processing outcomes for an intervention group that was taught rhyming skills with outcomes for children in a no-treatment comparison group that participated in regular preschool activities.

Met evidence standards with reservations

Slocum et al. (1993a) included 16 low-achieving preschool children attending four Head Start classrooms in an urban area of the Pacific Northwest. The study is part of a larger two-phase cross-over design study (see Slocum et al., 1993b, below) that included two treatment groups and two comparison groups. For the purposes of this review, the WWC includes only the results

from the phase one instructional period, during which the intervention involved blending, because the groups switched conditions in the phase two instructional period, which does not allow the effects of the prior condition to be separated from the effects of the later condition. In this study, phonological processing outcomes of children in the intervention group were compared with those of children in the corresponding comparison group who participated in word manipulation activities during phase one.

Slocum et al. (1993b) included 19 low-achieving preschool children attending four Head Start classrooms in an urban area of the Pacific Northwest. The study is part of a larger two-phase cross-over design study (see Slocum et al., 1993a, above) that included two treatment groups and two comparison groups. For the purposes of this review, the WWC includes only the results from the phase one instructional period, during which the intervention involved segmenting, because the groups switched conditions in the phase two instructional period, which does not allow the effects of the prior condition to be separated from the effects of the later condition. In this study, phonological processing outcomes of children in the intervention group were compared with those of children in the corresponding comparison group who participated in word manipulation activities during phase one.

Effectiveness

Findings

The WWC review of interventions for early childhood education addresses children's outcomes in six domains: oral language, print knowledge, phonological processing, early reading/writing, cognition, and math.[9]

Phonological processing. Six studies examined outcomes in the domain of phonological processing. Four studies showed statistically significant and positive effects and two studies showed substantively important and positive effects.

Majsterek et al. (2000) reported findings for one measure in this outcome domain, but no statistically significant difference

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9. The level of statistical significance was reported by the study authors or, where necessary, calculated by the WWC to correct for clustering within classrooms or schools and for multiple comparisons. For an explanation about the clustering correction, see the WWC Tutorial on Mismatch. See Technical Details of WWC-Conducted Computations for the formulas the WWC used to calculate the statistical significance. In the case of *Phonological Awareness Training,* corrections for clustering and multiple comparisons were needed.

was found (as calculated by the WWC).[10] The findings favored the intervention group, however, and were large enough to categorize the effect as substantively important and positive, according to WWC criteria.

O'Connor et al. (1993a) compared the blending and no-treatment comparison groups on nine measures in this outcome domain.[11] They reported statistically significant differences favoring the blending group for the three blending measures and one nonstatistically significant effect for a rhyming measure. They did not report statistical significance for the other five measures. The WWC confirmed the statistical significance reported by the authors. In this study, the effect was statistically significant and positive, according to WWC criteria.

O'Connor et al. (1993b) compared the segmenting and no-treatment comparison groups on the same nine measures in this outcome domain.[11] They reported statistically significant differences favoring the segmenting group for the three segmentation measures and one blending measure. They reported one nonstatistically significant finding for a rhyming measure. The authors did not report statistically significant findings for the other four measures, but some measures showed large effect sizes favoring the intervention group. The WWC confirmed the statistical significance reported by the authors for two of the segmentation measures and the blending measure, but not for the third segmentation measure. In this study, the effect was statistically significant and positive, according to WWC criteria.

O'Connor et al. (1993c) compared the rhyming and no-treatment comparison groups on the same nine measures in this outcome domain.[11] They reported statistically significant differences favoring the rhyming group for two of the three rhyming measures and no statistically significant differences for the third rhyming measure. The authors did not report statistical

significance for the other six measures. The WWC was unable to confirm the statistical significance reported by the authors; however, the findings were large enough to categorize the effect as substantively important and positive, according to WWC criteria.

Data from Slocum et al. (1993a) were used to compare the blend-then-segment intervention group with the word manipulation-then-segment comparison group on two measures in this outcome domain. The authors did not report statistical significance information for either of these measures; however, the WWC determined that there was a statistically significant difference favoring the intervention group on the blending measure. In this study, the effect was statistically significant and positive, according to WWC criteria.

Data from Slocum et al. (1993b) were used to compare the segment-then-blend intervention group with the word manipulation-then-blend comparison group on two measures in this outcome domain. The authors did not report statistical significance information for either of these measures; however, the WWC determined that there was a statistically significant difference favoring the intervention group on the segmenting measure. In this study, the effect was statistically significant and positive, according to WWC criteria.

Rating of effectiveness

The WWC rates the effects of an intervention in a given outcome domain as positive, potentially positive, mixed, no discernible effects, potentially negative, or negative. The rating of effectiveness takes into account four factors: the quality of the research design, the statistical significance of the findings,[9] the size of the difference between participants in the intervention condition and the comparison condition, and the consistency in findings across studies (see the WWC Intervention Rating Scheme).

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10. The WWC cannot use the author-reported significance levels because they are from an analysis of gain scores, which was not appropriate given that the pretest and posttest were two different tests in this study. The authors provided covariate adjusted posttest means.

11. O'Connor et al. (1993a, b, c) also administered a phonological mastery test to the intervention group children to assess how well they learned tasks in the intervention they received, but these were not administered to the comparison group children and were not considered in the impact analyses. Therefore, the WWC does not include results from this measure in this report.

The WWC found *Phonological Awareness Training* to have positive effects for phonological processing

Improvement index

The WWC computes an improvement index for each individual finding. In addition, within each outcome domain, the WWC computes an average improvement index for each study and an average improvement index across studies (see Technical Details of WWC-Conducted Computations). The improvement index represents the difference between the percentile rank of the average student in the intervention condition versus the percentile rank of the average student in the comparison condition. Unlike the rating of effectiveness, the improvement index is entirely based on the size of the effect, regardless of the statistical significance of the effect, the study design, or the analysis. The improvement index can take on values between −50 and +50, with positive numbers denoting favorable results. The average improvement index for phonological processing is +27 percentile points across the six studies, with a range of −27 to +50 percentile points across findings.

Findings for comparisons between variations of *Phonological Awareness Training*

The two studies described below do not contribute to the overall rating of effectiveness because the comparison involves two different variations of *Phonological Awareness Training,* which does not allow the effects of *Phonological Awareness Training* to be determined. However, the WWC believes that the findings from these comparisons provide useful information to practitioners who may be interested in comparing the effects of one variation of a practice to another variation of the same practice. The WWC reports the individual study findings here and in Appendices A4.1–A4.3.

Yeh (2003) included 44 four- to five-year-old low-income children attending four Head Start classrooms in two Head Start centers in the Boston, Massachusetts area. Forty-one percent of the children were Hispanic, 41% were African-American, 7% were Asian, and 11% were Caucasian. Yeh compared print knowledge, phonological processing, and early reading/writing outcomes for a group that participated in phonemic segmentation training with a group that participated in rhyme/alliteration training.

Maslanka and Joseph (2002) included 19 three- to five-year-old children attending a private preschool in a central Ohio suburban community. Most of the children studied were Caucasian. About half of the children were female. Maslanka and Joseph compared phonological processing outcomes for a group that used sound boxes with outcomes for a group that used sound sorts.

Print knowledge. Yeh (2003) analyzed findings for one measure in this outcome domain. The findings favored the phonemic segmentation group over the rhyme/alliteration group. Although the difference was not statistically significant (as calculated by the WWC), it was large enough to categorize the difference between the two groups as substantively important, according to WWC criteria. The improvement index for print knowledge is +33 percentile points for the one print knowledge outcome in this study.

Phonological processing. Yeh (2003) analyzed findings for four measures in this outcome domain.[12] The findings favored the phonemic segmentation group over the rhyme/alliteration group for all measures. Although the differences were not statistically significant (as calculated by the WWC), they were large enough to categorize the difference between the two groups as substantively important, according to WWC criteria. The average improvement index for phonological processing is +20 percentile points, with a range of +9 to +33 percentile points across findings.

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12. Yeh (2003) also reported a combined phoneme awareness score. The WWC does not include the measure in this report, however, because it is a composite of the individual tests and does not provide additional information beyond what is included for the individual tests.

Maslanka and Joseph (2002) compared the sound box and sound sort groups on four measures in this outcome domain.[13] The findings favored the concrete representation of the sounds in words (sound box) condition over the categorization of words based on sounds alone (sound sort) condition. The authors did not report statistically significant differences between groups for any of these measures, but the findings were large enough to categorize the difference between the two groups as substantively important, according to WWC criteria. The average improvement index for phonological processing is +11 percentile points, with a range of –10 to +29 percentile points across findings.

Early reading/writing. Yeh (2003) analyzed findings for one measure in this outcome domain. The findings favored the phonemic segmentation group over the rhyme/alliteration group. Although the difference was not statistically significant (as calculated by the WWC), it was large enough to categorize the difference between the two groups as substantively important, according to WWC criteria. The improvement index for early reading/writing is +26 percentile points for the one early reading/writing outcome in this study.

Summary

The WWC reviewed 11 studies on *Phonological Awareness Training.* Four of these studies met WWC standards and two studies met WWC standards with reservations. Two additional studies that either met standards or met standards with reservations are described in this report but are not included in the overall rating of effectiveness. The remaining studies did not meet WWC evidence screens. Based on the six studies included in the overall rating of effectiveness, the WWC found positive effects for phonological processing.[14] Based on the study that compared *Phonological Awareness Training* that focused on phonemes with *Phonological Awareness Training* that focused solely on rhyme and alliteration, the WWC found potentially positive effects on print knowledge, phonological processing, and early reading/writing. Based on the study that compared *Phonological Awareness Training* that focused on the concrete representation of the sounds in words with *Phonological Awareness Training* that included categorization of words based on sounds alone, the WWC found potentially positive effects on phonological processing. The evidence presented in this report may change as new research emerges.

References

Met WWC evidence standards

Majsterek, D. J., Shorr, D. N., & Erion, V. L. (2000). Promoting early literacy through rhyme detection activities during Head Start circle-time. *Child Study Journal, 30*(3), 143–151.

O'Connor, R. E., Jenkins, J. R., Leicester, N., & Slocum, T. A. (1993a). Teaching phonological awareness to young children with learning disabilities. *Exceptional Children, 59*(6), 532–546. (Study: blending intervention versus no-treatment comparison group.)

O'Connor, R. E., Jenkins, J. R., Leicester, N., & Slocum, T. A. (1993b). Teaching phonological awareness to young children with learning disabilities. *Exceptional Children, 59*(6), 532–546. (Study: segmenting intervention versus no-treatment comparison group.)

O'Connor, R. E., Jenkins, J. R., Leicester, N., & Slocum, T. A. (1993c). Teaching phonological awareness to young children with learning disabilities. *Exceptional Children, 59*(6), 532–546. (Study: rhyming intervention versus no-treatment comparison group.)

13. Maslanka and Joseph (2003) also reported findings for the overall score of the Test of Phonological Awareness, Kindergarten Version and the overall score of the Test of Phonological Awareness, Early Education Version. The WWC does not include these measures in the review, however, because there was not enough information available to compute effect sizes.
14. In O'Connor et al. (1993a, b, c) and Slocum et al. (1993a, b), the effects on measures that were more aligned with the nature of the *Phonological Awareness Training* (i.e., blending, segmenting) were larger than the effects on measures less aligned with the nature of the *Phonological Awareness Training.*

References (continued)

Yeh, S. S. (2003). An evaluation of two approaches for teaching phonemic awareness to children in Head Start. *Early Childhood Research Quarterly, 18*(4), 513–529.

Met WWC evidence standards with reservations

Maslanka, P., & Joseph, L. M. (2002). A comparison of two phonological awareness techniques between samples of preschool children. *Reading Psychology, 23*(4), 271–288.

Slocum, T. A., O'Connor, R. E., & Jenkins, J. R. (1993a). Transfer among phonological manipulation skills. *Journal of Educational Psychology, 85*(4), 618–630. (Study: blend-then-segment intervention versus word manipulation-then-segment comparison group.)

Slocum, T. A., O'Connor, R. E., & Jenkins, J. R. (1993b). Transfer among phonological manipulation skills. *Journal of Educational Psychology, 85*(4), 618–630. (Study: segment-then-blend intervention versus word manipulation-then-blend comparison group.)

Additional source:

Slocum, T. A. (1992). The learning and transfer of two phonemic manipulation skills. *Dissertation Abstracts International, 52*(08), 2889A. (UMI No. 9203306).

Did not meet WWC evidence screens

Hatcher, P. J., Hulme, C., & Snowling, M. J. (2004). Explicit phoneme training combined with phonic reading instruction helps young children at risk of reading failure. *Journal of Child Psychology and Psychiatry, 45*(2), 338–358.[15]

Laing, S. P., & Espeland, W. (2005). Low intensity phonological awareness training in a preschool classroom for children with communication impairments. *Journal of Communication Disorders, 38,* 65–82.[16]

Layton, L., Deeny, K., Upton, G., & Tall, G. (1998). A pre-school training programme for children with poor phonological awareness: Effects on reading and spelling. *Journal of Research in Reading, 21*(1), 36–52.[16]

For more information about specific studies and WWC calculations, please see the WWC *Phonological Awareness Training* Technical Appendices.

15. Confound: there was only one group in each study condition, so the analysis could not separate the effects of the intervention from the effects of group membership.
16. Lack of evidence for baseline equivalence: the study, which used a quasi-experimental design, did not establish that the comparison group was equivalent to the intervention group at baseline.